DESCRIPTION

1. General

The new LEARAVIAN Model P-10B is a compact portable radio receiver employing six tubes in a highly sensitive superheterodyne circuit designed for reception in three bands - Marine Band - 2.0 to 5.5 MC - ship-to-shore communications, Coast Guard weather reports, universal radio service for aircraft, U.S. Standard Time Signals, 2.5 to 5.0 MC shortwave broadcasts; Standard Broadcast Band - 550 to 1600 K C - entertainment, newcasts and weather information; Airways Band - 200 to 400 KC - airport communications, weather reports via range stations and airways 4-course beacon signals (A/N).

A built-in loop antenna provides adequate reception on all bands. As an added feature a panel mounted jack offers a convenient connection for an external antenna which is useful under adverse receiving conditions or where the set is used as a direction finder.

The new LEARAVIAN is designed for operation on 105-125 volts, 50-60 cycles ac (alternating current) or 105-125 volts dc (direct current) or battery pack. Special "refresher battery charging" circuits are incorporated for appreciably extending the life of the battery pack.

A panel mounted jack is also provided for plugging in headphones. When the headphones are plugged in the loud speaker is automatically made inoperative.

2. Power Supplies (AC, DC and Battery Pack).

CAUTION

DO not plug in this radio receiver to any other power supply outlet than specified below or severe damage to the equipment may result.
If you are in doubt as to the voltage rating of the power supply, consult the building electrician or your local power company before inserting plug of electric attachment cord.

Any of the following sources of electrical power are suitable for operation of the LEARAVIAN Model P-10B:

a) Ac (alternating current) - 105 to 125 volts 50 to 60 cycle.
b) Dc (direct current) - 105 to 125 volts.
c) Battery packs (any one of the following types.)
    General - No. 60A6F6.
    Eveready - No. 753.
    Burgess - No. F6A60.
    Ray-O-Vac - No. 60A-6F.

3. Tube Complement

The LEARAVIAN Model P-10B is shipped from the factory with a complete set of fully tested tubes installed in their proper sockets. The tube complement is as follows:

1 Type 1U4 Radio-frequency amplifier
1 Type 1R5 Converter (r-f).
1 Type 1U4 Intermediate-frequency amplifier.
1 Type 1U5 Detector-AVC-1st Audio amplifier.
1 Type 3V4 Power Amplifier.
1 Type 11723 Rectifier

4. Frequency Bands.

The frequency bands are as follows:

Dial Identification		Band	Frequency
Marine	(Blue)	Short-Wave	1960 to 5750 KC
BC	(Red)	Broadcast	550 to 1650 KC
Range	(Green)	Long-wave	1.95 to 5.5 MC

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The color of each dial scale corresponds with the color of one of the positions on the rim type band switch knob located at the right hand edge of the dial. Changing from one band to another is accomplished simply by rotating the knob up or down so that the desired band is in line with the indicating arrow. The proper dial scale for that band will then be in position also and in line with the indicating arrow. This is the scale that would be observed for tuning stations in the desired band.

INSTALLATION

NOTE

Since the LEARAVIAN Model P-10B is designed primarily as a portable radio receiver, very little consideration need be given the subject of "Installation." However, this set is also highly adaptable for marine and aviation use where a combination entertainment and utility portable receiver is desired. For these applications, an external antenna (to be used in conjunction with the built-in loop antenna) may be used to advantage as described in the following paragraphs.

1. Connecting to AC or DC (105 to 125 volts only).

The electric attachment cord for AC or DC operation is contained inside the cabinet and is arranged so it can be withdrawn after the back of the cabinet is opened. A notch for clearing the cord then permits the cabinet back to be closed. When the receiver is to be used on battery power, the cord can be replaced inside the cabinet.

2. Installing Battery Pack.

Ample space is provided in the bottom of the cabinet for any one of the correct types of battery packs listed. With the cabinet back opened, the battery holding bracket will be found held to the bottom of the cabinet with two screws. Remove the screws and bracket, then place battery pack in position as shown in Fig. 2. The battery socket should be on the right so that the battery connecting plug can be inserted. Replace battery bracket and fasten firmly with the two screws. Insert battery connecting plug and close cabinet back.

3. Installing External Antenna.

An external antenna may be used with the LEARAVIAN P-10B to improve rec-reception under adverse conditions. The effectiveness of an outside (external) antenna depends largely on its location and length and no specific instructions can be given which will be found ideal under all circumstances.

In general the antenna should be about 20 to 40 ft. long. Small size insulated wire is usually most convenient. DO NOT USE SHIELDED WIRE. The insulation must be removed from the end of the lead-in to make connection to the INNER connector of a standard phone plug (PL-55) which is then plugged into the jack marked "ANT".

Marine or aircraft installations will be governed to a great extent by structural facilities. In all cases, however, the external antenna should be well constructed. Do not shield the lead-in. Be sure that neither the antenna proper nor the lead-in interferes with the existing controls or equipment of the boat or airplane. Secure lead-in at intervals throughout its length to prevent fouling.

In most cases, the LEARAVIAN performs well in a boat or airplane that does not have shielded ignition circuits. However, shielding of spark plugs, magnetos and generator, along with all ignition wires is very desirable. Complete shielding will remove all trace of background ignition noises which tend to reduce the effective receiving range of the radio.

OPERATION

1. Warning on Power Source.

Do not connect this receiver to any power supply other than 105-125 volts 50-60 cycles ac (alternating current) or 105-125 volts dc (direct current) or battery packs as specified previously.

2. Selecting Power Source.

Move Power Selector Switch Knob (at left end of dial) so that marking on knob ("BATT" of "AC") is opposite the indicating arrow, depending on whether battery operation or AC-DC operation is desired. DO NOT MOVE KNOB TO "CHARGE " UNTIL DIRECTIONS IN PARAGRAPH 10 HAVE BEEN NOTED CAREFULLY.

3. Applying Power.

With the Power Selector Switch knob in the correct position, turn the ON-OFF switch and Volume Control knob (at left of handle) clockwise until a click is heard. Further rotation increases volume. Power is now being applied to the radio. On "BATT" (Battery) operation, stations can be tuned in immediately, but on "AC" (AC or DC) operation allow a few moments for the tubes to heat up. Where the set is plugged in to dc (direct current) and no response is obtained after one minute, reverse the electric attachment plug in the socket.

4. Selecting Frequency Band.

Move Band Selector switch knob (at right end of dial) up or down so that marking on knob ("RANGE", "BC", or "MARINE") is opposite the indicating arrow, depending on which band is desired. The dial scales are so arranged that as the knob is moved to any of the three positions, the corresponding scale will move simultaneously and be in line with the indicating arrow.

5. Tuning in a Desired Station.

Turn Station Selector knob (at right end of handle) to right or left until dial pointer is over the approximate frequency reading of the desired station (as read on the dial scale opposite the indicating arrow).

Then advance (turn clockwise) the volume control knob until reception is audible. Turn station selector knob right or left slowly until desired station is perfectly tuned in (on the "center" of the station) and adjust volume as required. Never reduce the volume by tuning "off" the station since this will cause distorted reception.

6. Loop Antenna Directional Effects.

The built-in loop antenna provides a directional receiving effect which is noticeable when the LEARAVIAN is lifted by the handle and turned slowly first in one direction and then the other. The station will come in strongest when either end of the set faces the direction of the station, and the station will be weakest or fade out (null) when either the front(speaker) or back faces that same station.

This directional effect serves a three-fold purpose:
a) Weak or distant stations can be received better by rotating the set until they are best received.
b) Local noise interference can be minimized on a particular station by rotating the set until the signal-to-noise ratio is best.
c) Direction finding is possible since the fade out or null is comparatively "sharp" when the front or back of the set faces the station.

NOTE For direction finding applications of the LEARAVIAN, an external antenna plugged in and used as described in par. 7 is recommended.

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7. Direction Finding.

To determine the direction of a received station, slide the RECEIVING DIRECTION FINDING switch to the DIRECTION-FINDING positions and plug in the external antenna. Rotate set until station fades out, then unplug external antenna and slowly rotate set first in one direction and then the other so that the exact aural-null point is determined. At this point the speaker of the set is pointing to the station.

8. Headphone Reception.

To connect headphones to the LEARAVIAN, attach a Type PL-55 (or equivalent size) phone plug to the cord and plug in to the "PHONES" jack (to the left of the "RECEIVING-DIRECTION FINDING" switch).

When phones are plugged in, the loudspeaker is automatically cut out of the circuit and therefore silenced.

NOTE Headphones having 200 ohms resistance are recommended for use with the LEARAVIAN.

9. Shutting OFF Power.

Turn ON-OFF switch and Volume Control Knob counter-clockwise until a click is heard. This shuts off power, either from AC-DC or battery.

Be sure to shut off power when through using the set, especially, if the set is being operated on battery.

10. "Charging Battery"

The useful life of the battery pack may be extended appreciably by periodic "charging". This is conveniently done by plugging the attachment cord in to 105 to 125 volt, 50 to 60 cycle ac or 105 to 125 volt dc electric outlet and moving the Power Selector Switch Knob to "charge". Then apply power by turning ON-OFF switch to "ON" position.

For best results it is recommended that the battery be charged twice as long as it was discharged. For example, if the set has been battery operated for a period of four hours, the battery should be charged for approximately eight hours. It is desirable to charge the battery after each period of battery operation, rather than charging for a long time to cover several operative periods.

NOTE During the charge cycle, the radio is inoperative.

On completion of the charge cycle always return the Power Selector Switch to either "AC" or "BATT" positions, even if the ON-OFF switch is turned "OFF".

CARE AND MAINTENANCE

NOTE There are no adjustments of any king to be made on the chassis or speaker.

1. Battery Replacement.

After extended use of the pattery pack its reserve power may be weakendd sufficiently so that the "CHARGE" operation will no longer be effective and the performance of the set on "BATT" may not be satisfactory. The battery pack should then be replaced. Replacement battery packs may be obtained from your local Lear dealer or from radio supply houses. Be sure the number of the battery corresponds with one of the listed previously.

To replace battery, refer to par. "Installing Battery Pack". Carefully disconnect battery cable attachment plug from old battery and remove battery bracket permitting removal of battery,

2. Tube Replacement.

The Tubes in the set should be checked occassionally either by taking them out and having them tested or by obtaining a new set of tubes and inserting them in the sockets, one at a time, noting any difference in performance.

The type of tubes required and the position of these tubes are clearly shown in Fig. 2. The type number is etched or stamped on each tube. Should it be necessary to replace any tubes, gently rotate the tube until the pins drop into the socket. Then push down until tube is seated firmly in socket.

Alignment Chart
(See diagram Fig. 2)

Step	Alignment of	Generator Connected	Dummy Antenna	Generator Frequency	Receiver Dial Setting	Adjustment ***
1.	Set dial pointer to thin line at end of dial with tuning gang fully closed.					
2.	I.F.	r-f section of gang and ground	.01 mf	455 kc	1000 kc	T5 Bottom and top
3.						T4 Bottom and top
4.	Range Band	Ant. Jack and ground	30 mmf	400 kc	400 kc	C22 (osc. trimmer)
5.						C16 (r-f trimmer)
6.						C7 (Ant. trimmer)
7.				220 kc	220 kc*	C20 (osc. padder)
8.	Repeat steps 1,5,6 and 7 until no further improvement is obtained.					
9.	Broadcast Band	Ant. jack and ground	30 mmf	1500 kc	1500 kc	C21 (osc. trimmer)
10.						C15 (r-f trimmer)
11.						C6 (ant. trimmer)
12.				600 kc	600 kc*	C19 (osc. padder)
13.	Marine Band	Ant. jack & ground	30 mmf	5 mc	5 mc*	C13 (osc. trimmer)
14.						C12 (r-f trimmer)
15.						C4 (ant. trimmer)
16.		**	1 ft. lead	5 mc	5 mc	C4 (loop trimmer)

*Rock tuning gang rotor while adjusting.
** Place 1 ft. antenna lead from generator near loop.
The loop and antenna trimmer C4 is reached through hole in back cover of cabinet.
*** All adjustment are for maximum output.

VOLTAGE MEASUREMENTS							
Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1U4 VT1	2.6	93	93	.3	-	-	4
1R5 VT2	0	93	55	-8	0	-	1.3
1U4 VT3	4	93	93	-	3.9	-.4	5.4
1U5 VT4	1.3	40	25	-	-	-	2.6
3V4 VT5	5.4	90	93	93	6.5	-	7.8
11723 VT6	-	117AC	0	0	115AC	120	-
RESISTANCE MEASUREMENTS							
1U4 VT1	45	*200	*0	2M	45	5M	60
1R5 VT2	-	*16	15 K	100K	.2	5M	28
1U4 VT3	60	*24	0	-	60	1.6	70
1U5 VT4	28	470 K	5M	1M	1M	10M	45
3V4 VT5	70	650	0	0	75	2.2	95
11723 VT6	-	-	700	0	725	2400	-

NOTES:

All resistance measurements are to artificial ground (indicated by symbol ⏚ on schematic diagram); those marked * are from the 90 volt positive pin on the battery plug (see schematic diagram no. 64165).

All voltage measurements are to artificial ground (indicated by symbol ⏚ on schematic diagram). All are DC unless otherwise indicated.

Measurements made with 20,000 ohm per volt meter.

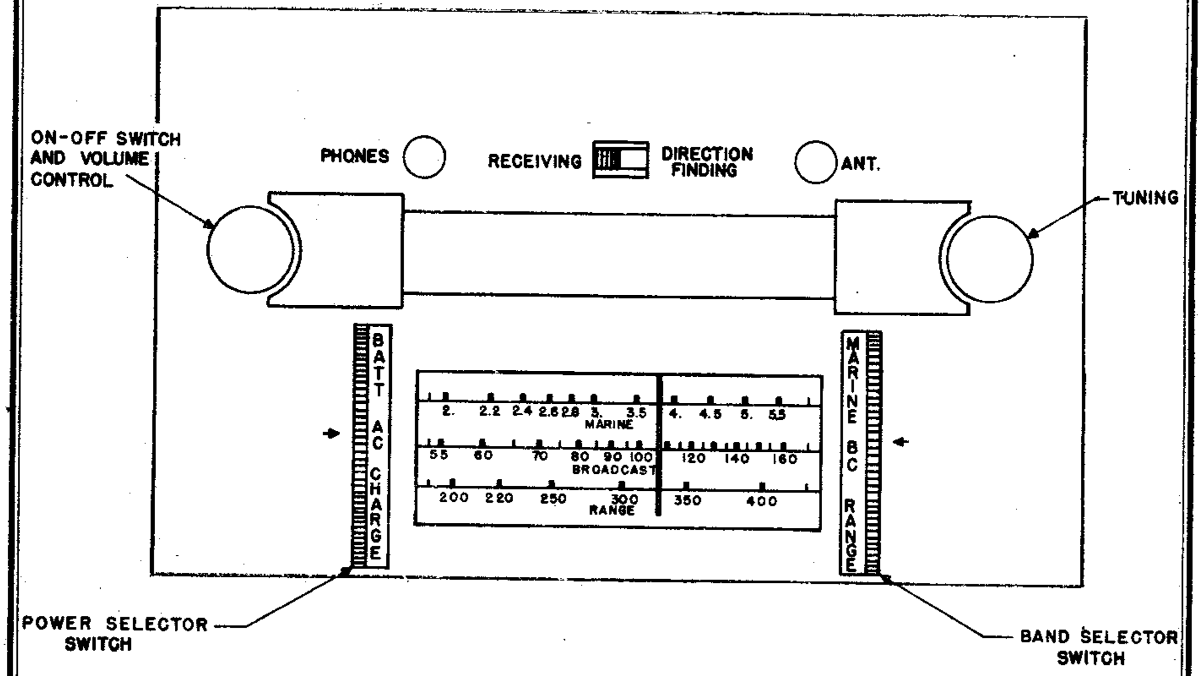


FIG. 1 OPERATING CONTROLS

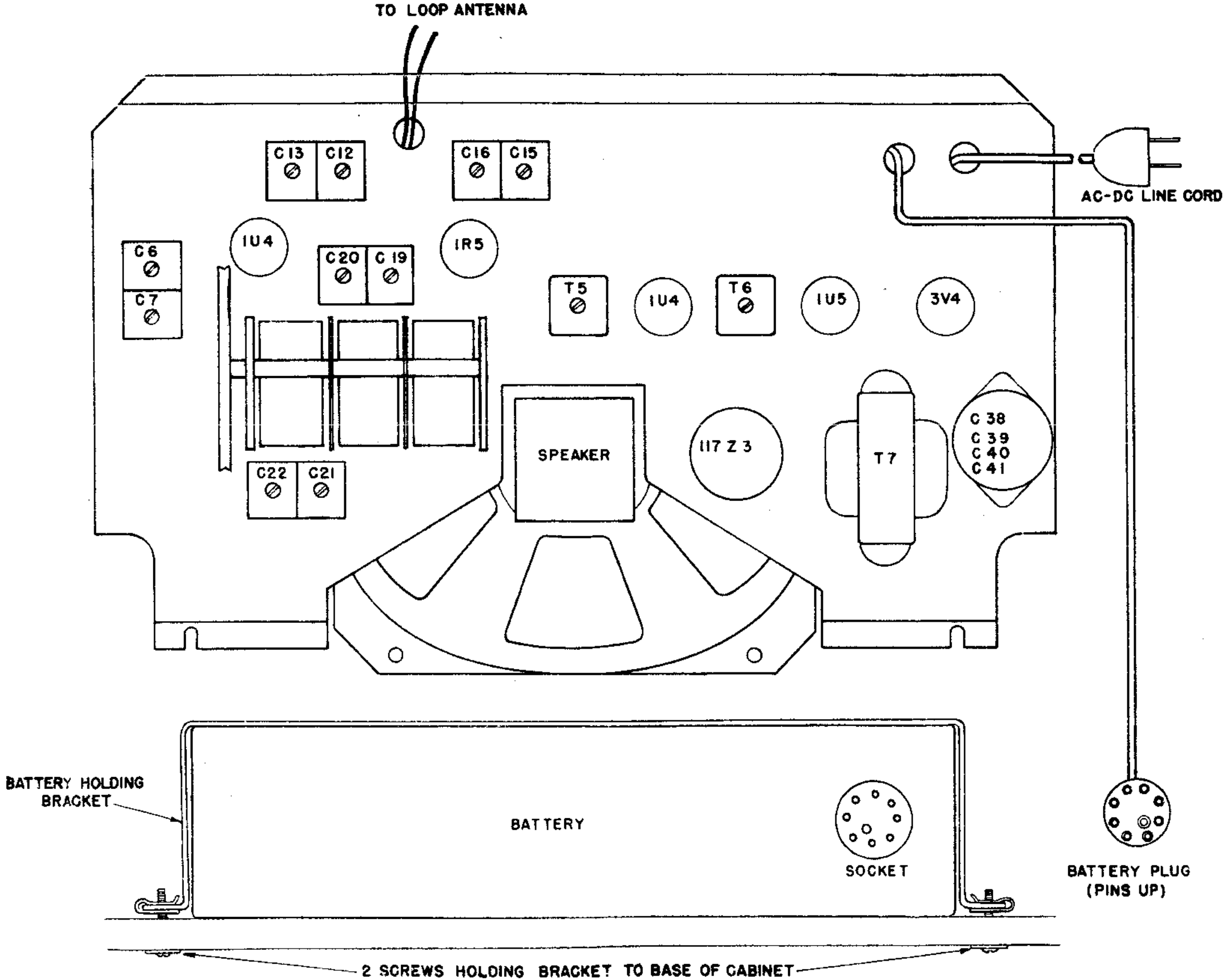
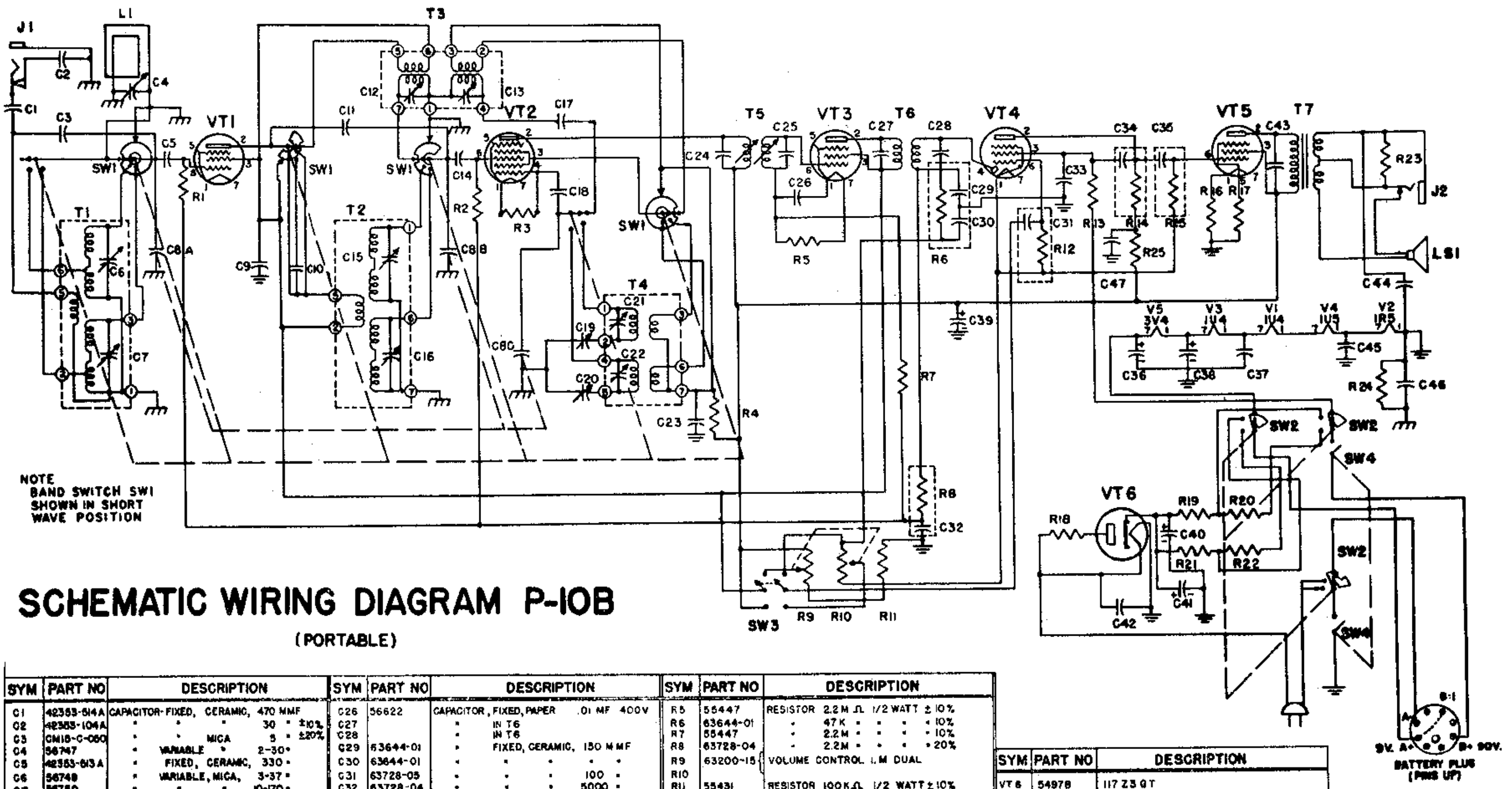


FIG.2 TUBE PLACEMENT AND ALIGNMENT DIAGRAM



NOTE
BAND SWITCH SW1
SHOWN IN SHORT
WAVE POSITION

SCHEMATIC WIRING DIAGRAM P-10B

(PORTABLE)

SYM	PART NO	DESCRIPTION
C1	42353-514A	CAPACITOR-FIXED, CERAMIC, 470 MMF
C2	42353-104A	" " " 30 " ±10%
C3	CM15-C-050	" " MICA 5 " ±20%
C4	56747	" VARIABLE " 2-30"
C5	42353-513A	" FIXED, CERAMIC, 330"
C6	56749	" VARIABLE, MICA, 3-37"
C7	56750	" " " 10-170"
C8A	63763	" " AIR, 3 GANG
C8B		
C8C		
C9	56603	" FIXED, PAPER .1MF 200 V
C10	42353-106A	" " CERAMIC 50 MMF ±10%
C11	CM15-C-050	" " MICA 5 " ±20%
C12	56748	" VARIABLE, MICA 3-37"
C13	56748	" " " " "
C14	42353-513A	" FIXED, CERAMIC, 330 "
C15	56748	" VARIABLE, MICA 3-37 "
C16	56750	" " " 10-170"
C17	CM30-C-182G	" FIXED, " 1800 " ±2%
C18	42353-308A	" " CERAMIC, 100 " ±10%
C19	56754	" VARIABLE, MICA, 100-590"
C20	56751	" " " 20-270 "
C21	56748	" " " 3-37 "
C22	56750	" " " 10-170
C23	56600	" FIXED, PAPER .05 MF
C24		" IN T5
C25		" IN T5
C26	56622	CAPACITOR, FIXED, PAPER .01 MF 400V
C27		" IN T6
C28		" IN T6
C29	63644-01	" FIXED, CERAMIC, 150 MMF
C30	63644-01	" " " " "
C31	63728-05	" " " 100 "
C32	63728-04	" " " 5000 "
C33	56603	" " PAPER .1 MF 200 V
C34	63728-07	" " CERAMIC 100 MMF
C35	63728-06	" " " " "
C36	42289	" ELECTROLYTIC 100 MF 15 VDC
C37	56603	" FIXED, PAPER, .1MF 200 V
C38	63785	" ELECTROLYTIC 100 MF 12 VDC
C39		" " 40 " 150 "
C40		" " " " " "
C41		" " " " " "
C42	56628	" FIXED, PAPER .05 MF 400 V
C43	56613	" " " .001 " " V
C44	56622	" " " .01 " " V
C45	56603	" " " .1 " 200V
C46	56661	" " " .2 " 600V
C47	56603	" " " .1 " 200V
R1	55492	RESISTOR 3.3 M Ω 1/2 WATT ± 20%
R2	55492	" " " " " 20%
R3	55431	" 100K Ω " " " 10%
R4	55421	" 15 K Ω " " " 10%
R5	55447	RESISTOR 2.2 M Ω 1/2 WATT ± 10%
R6	63644-01	" 47 K " " " " 10%
R7	55447	" 2.2 M " " " " 10%
R8	63728-04	" 2.2M " " " " 20%
R9	63200-15	VOLUME CONTROL 1 M DUAL
R10		
R11	55431	RESISTOR 100K Ω 1/2 WATT ± 10%
R12	63728-05	" 10 M " " " " 20%
R13	55492	" 3.3 M " " " " 20%
R14	63728-07	" 470K " " " " 20%
R15	63728-06	" 2.2 M " " " " 20%
R16	55409	" 1500 " " " " 10%
R17	55409	" " " " " " 10%
R18	55388	" 27 " " " " 10%
R19	57342	" 1 K " 1 " " 10%
R20	55739	" 2.2 K " 1 " " 20%
R21	2310	" 2250 " 10 " " 5 %
R22	2316	" 2 K " 10 " " 10 %
R23	55473	" 2.2 K " 1/2 " " 20%
R24	55487	" 470K " 1/2 " " 20%
R25	57104	" 220K " 1/2 " " 10%
VT1	63760	TUBE 1U4
VT2	54982	" 1R5
VT3	63760	" 1U4
VT4	63761	" 1U5
VT5	63762	" 3V4
VT6	54978	117 Z3 GT
T1	43313	TRANS. ANT. BC & RANGE BAND
T2	43314	" RF BC & " "
T3	43316	RF MARINE & OSC. MARINE BAND
T4	43315	COIL OSC. BC & RANGE BAND
T5	63621	TRANS. I F
T6	63619	" "
T7	53758	" AUDIO OUTPUT
SW1	43300	SWITCH, BAND CHANGE
SW2	43301	" FUNCTION
SW3	50230	" SLIDE DPDT
SW4		SWITCH PART OF VOLUME CONTROL
J1	2628	JACK ANT.
J2	2628	" PHONE
LS1	63751	SPEAKER
L1	63747	LOOP ANTENNA